Guidelines for Medical Monitoring Programs in British Columbia Mines

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FOREWORD

In order to reflect the protection afforded persons under the Charter of Rights regarding legislated medical monitoring, the Mines Act, 1989 and the Health, Safety and Reclamation Code for Mines in British Columbia, 1990, do not require compulsory medical screening or monitoring of persons employed in the mining industry.

The Code prescribes that the decision to introduce a medical surveillance program is at the discretion of the mine manager; however, the Chief Inspector of Mines may require a program to be set up when he believes there is a need. Participation in such a program by employees is entirely voluntary and any employee who does participate may choose the medical physician for the examination.

It should be noted that the program is to be made available to persons subjected to exposures prescribed in the Code; it is not prescribed as a pre-employment medical examination.

It is recognized that programs exist at mines prescribed under Section 19 of the former Mines Act, S.B.C., 1980, c.28. These programs, provided that they meet the new conditions outlined above, will fulfill the requirements of a program under the Code. The Workers' Compensation Board (W.C.B.) is no longer required to provide the services which they gave under the 1980 Act. The continued use of the W.C.B. to examine X-rays and other medical data will now be left to a private arrangement between the mine manager or the company representative and the W.C.B., but the W.C.B. will no longer issue a certificate of fitness.

It is realized that because these guidelines are new it may be necessary to make amendments after their introduction and use. All who participate should make their concerns, if any, known to the Chief Inspector of Mines.

INTRODUCTION

The Health, Safety and Reclamation Code for Mines in British Columbia requires the mine manager to notify the Chief Inspector of Mines when he believes there is a need for a medical surveillance program for certain persons at the mine.

Persons for whom a medical surveillance program is needed are those in a dust exposure occupation, those exposed to excessive noise, or those exposed to any chemical, physical or radiation agent specified by the Chief Inspector of Mines.

A medical surveillance program proposed by the mine manager, and/or required by the Chief Inspector of Mines, shall be modelled in accordance with these guidelines.

These guidelines have been prepared in a general format to cover all areas at a mine and the different exposure elements. Appendices are attached which relate to specific occupational exposures.

While the Code places the primary responsibility on the mine manager to provide a medical surveillance program when necessary, Section 2.12.1(2) also empowers the Chief Inspector of Mines to require a medical surveillance program if there is a need.

The Code is quite specific as to requirements of the program, the mine manager's responsibilities in informing persons working in a prescribed occupation of the health risks, the administration of the program and the fact that persons involved have the option of participating in the program.

The Occupational Health and Safety Committee should participate in developing and implementing the goals, objectives and contents of a program if the mine manager considers one is needed.

PURPOSE OF A MEDICAL SURVEILLANCE PROGRAM

The medical examination and/or clinical testing, and audiometric testing is to provide a physician with information to establish a baseline of a person's health status. From this information changes to the individual's health can be measured; the physician is able to advise on any conditions which might put the person at more risk and hence recommend any restrictions or precautions which should be taken.

If ongoing medical examination and testing is part of a carefully designed and controlled research program, it may be used to identify abnormalities or deterioration that could be used as epidemiological evidence (the evidence gathered relating to the incidence, distribution and control of disease in a population) to link workplace exposures to disease and offer health benefits to the persons who are examined and tested.

Medical surveillance results should be used to help provide for better definition of what levels of concentration for toxic or deleterious substances in the workplace cause health effects and thus provide information to suggest the modification of permissible exposure limits currently used in the workplace.

Persons who choose to participate may find Workers' Compensation Board claims easier to justify if they can show deterioration of their health because of job-related exposure.

The program may help show the success or failure of engineering controls of the working environment, but the program must not lessen the ongoing work to improve workplace environmental standards or the need for environmental monitoring. It is to be expected that the introduction of a medical surveillance program would add impetus to the improvement of environmental standards.

In order to make a medical surveillance program effective and efficient, it should be recognized that the more centrally controlled the test the more valid the results. Hence, it may be considered appropriate to have one medical physician appointed to examine

all persons who choose to participate. This, of course, is not mandated under the new Mines Act. It is suggested, however, that the advantages of such an appointment be pointed out to employees but also that it does not affect their right to choose their own physician.

If one physician is to be chosen, then it must be as a result of a collective decision made by the Occupational Health and Safety Committee on behalf of all the persons whose health may be at risk and who choose to participate in the medical surveillance program. If the Committee cannot agree then the advice of the Chief Inspector of Mines should be sought.

In circumstances where different physicians may be involved in the medical examinations and clinical testing, it may be an advantage to use an occupational health physician to define, supervise and give medical advice as to the effectiveness of the program. Where this procedure is proposed, the Mines Act does not require that the medical persons who examine the employees provide the supervising physician with the results of their examinations.

As mentioned in the foreword, the services of the Workers' Compensation Board may continue to be used, but these again would depend on a local arrangement with the mine manager.

OBJECTIVES OF A MEDICAL SURVEILLANCE PROGRAM

The main objectives of a medical surveillance program are:

- to detect exposure-related health risks;
- to stop the continuing development of and/or reverse exposure related health effects;
- to provide information which would lead to intervention;
- to correct exposure controls in the widest sense; and
- to confirm and ensure the adequacy of exposure controls.

In order to ensure that the program relates to occupational requirements and to ensure uniform standards throughout the mining industry it shall provide for the following:

(1) There must be criteria for evaluating each aspect of the medical surveillance program which is used to assess exposure and/or identify or measure subclinical or clinical effects. Such criteria should address the following questions:

(a) Is the test result strongly correlated with a true health effect?

(b) Does the test identify subclinical effects (changes) before a clinical problem (disease) has developed?

(c) Is the test result reproducible? (The method of carrying out the tests must be described sufficiently to allow for their replication.)

(d) Do test results deviate from normal values quickly in response to changes in the intensity and/or length of exposure?

(e) Is the test as non-invasive as possible such that there is no unreasonable risk to health?

Clearly the most appropriate of the above criteria should be combined into a weighting system which can be easily applied by the examining physician. If a weighting system is not provided, the examining physician should be given guidance on the interpretation of the combined results from multiple elements.

(2) If a program includes more than one element (e.g. an occupational and health history, laboratory tests and/or clinical examination for health effects), there must be criteria for evaluating the application of the elements as a package, such as:

(a) Does each element meet as many as possible of the criteria outlined above?

(b) Do the combined results from individual elements meet criteria 1(a) to 1(e)?

(3) There must be criteria by which to evaluate whether the preventative actions taken as a consequence of the results obtained (e.g. removal and new control programs) are effective in reducing adverse effects from exposure. Such criteria should address the following questions:

(a) Do preventative actions taken as a result of test results improve survival or function or both in workers examined?

(b) Do health benefits from the surveillance outweigh the known health risks involved with the tests?

(c) Do the beneficial effects of the surveillance program outweigh the negative psychological, economic or social effects including the possible labelling of a person as diseased or at high risk?

CONTENT OF A MEDICAL SURVEILLANCE PROGRAM

A medical surveillance program as described in the Health, Safety and Reclamation Code for Mines in British Columbia shall provide for all or some of the following:

- a system to inform persons of the health risks and potential or possible effects to health of working in the prescribed occupation;

- a medical examination and/or clinical testing;

- development of a hearing conservation program and its maintenance, with audiometric testing carried out by a certified audiometric technician;

- complete confidentiality of personal medical records with the exception that audiometric information shall be made available to the Chief Inspector of Mines;

- provision of the results of the medical examination to the person examined;

- advice as to the person's suitability to work in the prescribed occupation;

- advice as to any work restriction resulting from the person's medical condition;

- instruction in the health precautions required;

- the costs of the medical examination, clinical tests and audiometric testing to be borne by the employer; and

- chemical analysis necessary for biological monitoring to be carried out in a laboratory acceptable to the Chief Inspector of Mines.

PROCEDURE FOR THE MINE MANAGER

After hiring a person and prior to placement of that person, or for persons already employed in one of the prescribed occupations for which there is a medical surveillance program, the mine manager shall ensure that:

(1) The person is fully informed of the health risks of the job. Some examples of the information to be given are:

(a) In a crushing plant: types of harmful dust present; the effects of different sizes of dust in the atmosphere on the respiratory system (most harmful dust is not visible to the naked eye); effect of loud noise on the ears (high noise is greater than 85 dBA for eight hours).

(b) In a maintenance shop: the presence and names of toxic chemicals used; the effects of welding fumes from various welding methods; the need for adequate ventilation where diesel equipment is operated because of the respirable combustible dusts in the exhaust gas.

(c) In underground workings: the constituents and effects of blasting fumes and of diesel engine exhaust. Pollutants from such sources could include oxides of nitrogen, carbon monoxide, hydrogen sulphide, sulphur dioxide and respirable combustible dusts.

(d) The hazards of using hand-held percussive tools with respect to vibration effects on the body (Raynaud's disease, commonly known as white finger disease).

(e) The toxicity and the effects of various chemicals used in the workplace. A useful reference is the booklet "How Workplace Chemicals Enter the Body," PS 85-6E published by the Canadian Centre for Occupational Health and Safety.

(2) The person is fully informed of the protective measures available such as local exhaust and general ventilation and personal protective equipment (e.g. ear plugs, ear muffs, various types of dust masks, barrier creams, etc.) and their limitations to reduce the exposure in the workplace where the person is to be employed.

(3) The person is provided with the details of the medical surveillance program in place under which he or she can be examined by a physician. Such details should include:

(a) The reasons why a person should be medically and/or clinically examined.

(b) The expectations of the medical examination and clinical tests.

(c) The means whereby the person's health information will be kept confidential and not available to any person, including the employer, other than the physician (and the W.C.B. if they are involved in the program); the exception is the hearing test data which is to be available to the Chief Inspector of Mines.

(d) The assurance that the person shall be advised of the results of the medical examination and/or tests by the examining physician and of his/her suitability for the occupation.

(e) That advice will be given by the physician of the precautions that should be taken to prevent possible adverse effects from the working environment.

(f) If the physician, the employer and the employee agree that to continue to work in the job assigned would put the employee's health at undue risk then:

- they will determine if the employee could work at the assigned job with suitable and effective protective equipment; and

- if it is necessary to remove the employee from the assigned job, the employer shall make every effort to find the employee an alternative suitable job.

(g) The frequency at which examinations and/or tests will be carried out, subject to an arrangement between the mine manager and the person where more frequent examinations may be necessary; and

(h) That the mine manager will provide the examining physician with:

- a copy of the medical surveillance program;

- a description of the work/job to be performed;

- a description of the workplace environment, with details of workplace contaminants and expected exposure levels;

- current Threshold Limit Values for contaminants in the workplace (see the Health, Safety and Reclamation Code for Mines in British Columbia - Part 2, Appendices A,B,C,D and E, and tables 2-1 and 2-2); and

- details of protective equipment available, personal and otherwise.

The mine manager must point out that participation in the program is entirely voluntary and also that a person can select the physician for the medical examination.

EMPLOYEE PARTICIPATION

A medical surveillance program comes into play after a person has been hired; it is in no way related to the employer's hiring procedures.

While employees may select a physician of their choice it could be more effective and more efficient to have the medical examinations of all employees carried out by one medical physician. This has been discussed earlier under the Purpose of a Medical Monitoring Program.

Employees examined by a physician have the right to know the results of the examination and of any tests conducted, the possible effects if problems are identified, and shall be given a copy of the examination results if they request it.

As the results of the examination and tests are confidential, employees should indicate in writing (see Appendix 2 for suggested format) if a copy of them could be given to the employer or the company occupational health physician (if such person is appointed). Consent may only be given after persons have been informed of their right to confidentiality.

All persons in dust exposure occupations should keep themselves informed of the possible adverse effects of such a working environment.

Persons participating in a medical surveillance program have the right to ask for and obtain advice from a physician regarding their suitability or fitness to perform the job; what, if any, are the work restrictions arising from the medical results, and what health precautions should be taken.

Persons must be satisfied that they understand the risks and hazards before starting a job, that they have received adequate training in the use of all protective equipment, both personal and otherwise, and in the safe practices required to handle or deal with any toxic substances. Persons should actively seek advice and counsel from a representative of the Occupational Health and Safety Committee if they have any doubts about or lack understanding of information provided.

Employees who participate in a medical surveillance program must realize that there is still the need for regular private physical examinations by their personal physician.

Persons who opt out of or only wish to participate in part of a medical surveillance program should seek advice from their personal physician and if necessary the Occupational Health and Safety Committee as to the possible consequences of their action.

MEDICAL EXAMINATION AND TESTS

The medical examination and tests shall follow the procedures for the appropriate investigation related to the environmental hazards associated with the workplace environment. Examples are given in the Appendices 3 and 4 attached.

The physician, after receiving all the pertinent information relating to the job, workplace, environment, the process, contaminants and hazard control measures to which persons may be exposed, should counsel patients as to their suitability for the occupation and any constraints and advice on health precautions recommended. The physician will provide the patients with a medical examination record.

Appendix 1

Occupational Exposure to Asbestos, Coal or Silica Dust

In the Health Safety and Reclamation Code a "dust exposure occupation" means employment

(1) In an asbestos mine;

(2) Where persons are normally required to work more than 20 per cent of their working time in any one month;

  (a) underground in a mine;

  (b) in the mining activity of open pit and glory hole operations;

  (c) in crushing plants, assay grinding rooms, or coal cleaning plants;

  (d) in operations that involve dry milling or dry concentrating;

  (e) in wet concentrating plants where the plant is not adequately separated from dry crushing plants; or

(3) At other locations designated by the Chief Inspector of Mines.

While the Code defines designated areas for dust exposure, if there are other work areas which the mine manager considers should be designated, then the District Inspector of Mines should be contacted for further advice.

Recognition of the Sources of Asbestos, Coal or Silica Dust

The most appropriate method of dust suppression is to eliminate the dust at the place it is produced by using properly designed engineering controls, by the application of a wetting agent (water, steam), chemical agents and/or mechanical dust collection systems.

Appendix 1 (Cont'd.)

The control system used should ensure that dust which is suppressed is not reintroduced into the handling process downstream of the initial collection or treatment location.

Where it is not possible to remove dust at the place it is produced, a procedure to limit the exposure of individuals should be considered. Personal protective equipment should only be introduced as a last resort or during the periods when experiments are being conducted on the most effective methods to control the dust.

Appendix 2

Sample Medical Examination Record

EMPLOYEE NO. _____

LAST NAME _____ FIRST NAME _____ DATE OF BIRTH _____ (M/D/Y)

POSITION/JOB _____ WORK AREA _____

PLEASE CHECK ONE: ___ PRE-PLACEMENT MEDICAL EXAMINATION ___ SUBSEQUENT MEDICAL EXAMINATION

COMPLETE SECTION A OR B IN ALL CASES

PLEASE CHECK WHERE APPROPRIATE

SECTION A ___ HEALTH STATUS COMPATIBLE WITH KNOWN WORK REQUIREMENTS - NO LIMITATIONS OR RESTRICTIONS

PLEASE CHECK WHERE APPROPRIATE

SECTION B ___ HEALTH STATUS LIMITATIONS OR RESTRICTIONS

___ PHYSICAL LIMITATIONS

a. Specify any physical work or task limitations:_____

_____

b. Duration of limitation: ___ Permanent ___ Temporary: Specify time period _____

___ WORK ENVIRONMENT RESTRICTIONS

a. Specify any environment or exposure restrictions_____

_____

b. Duration of limitation: ___ Permanent ___ Temporary: Specify time period _____

Appendix 2 (Cont'd.)

SECTION C AND D ARE COMPLETED OPTIONALLY

SECTION C ___ SPECIAL PROTECTIVE EQUIPMENT MODIFICATION REQUIRED

Specify _____

SECTION D RE-EVALUATION DATE _____ EXAMINER'S NAME & POSITION _____
(M/D/Y)

EXAMINER'S SIGNATURE _____

DATE SIGNED _____
(M/D/Y)

SELECT COPY ROUTING APPROPRIATE TO THE SITUATION

WHITE - MEDICAL FILE YELLOW - EMPLOYEE PINK - MANAGER - **Only provided to the manager if the employee signs in this section and understands that this is optional.**

EMPLOYEE SIGNATURE _____ DATE SIGNED _____
(M/D/Y)

Appendix 3

Content of Medical Examinations for Dust Exposure Occupations to Asbestos, Coal or Silica Dust

A medical surveillance program should provide for the following:

- pre-placement medical examination; and
- subsequent medical examination.

Pre-placement Medical Examinations

These should include:

- chest X-ray (approximately 36 cm by 43 cm);
- lung function screening;
- work and health history; and
- other medical tests which are clinically indicated.

The chest X-ray should be of high quality and preferably classified according to the International Labour Office (1980) International Classification of Radiographs of Pneumoconiosis.

The lung function screening should include forced vital capacity (FVC) and forced expiratory volume in one second (FEV1). As well as recording absolute figures corrected to body temperature, pressure and saturation (BTPS), it is useful to present the results as a percentage of predicted normal.

Subsequent Medical Examinations

Asbestos Dust

(1) A medical examination at intervals not exceeding two years.

(2) Shorter intervals, however, may be required by the examining physician when a worker is considered to be at special risk.

Coal or Silica Dust

(1) (a) Persons under 50 years of age:
- a medical examination one year after initial exposure and at intervals not exceeding four years thereafter.

(b) Persons 50 years and older:
- a medical examination one year after initial exposure and at intervals not exceeding two years thereafter.

(2) Shorter intervals may be required by the examining physician when a worker is considered to be at special risk.

Issuance of a Medical Examination Record

Following any medical examination a medical examination record shall be issued.

Medical Files

When a mine is closed down permanently or for an indefinite period, all the medical files of employees which have been kept by a physician must be stored in a confidential manner or forwarded to the office of the Chief Inspector of Mines. All medical records shall be kept for a period of not less than 45 years.

Appendix 4

Occupational Exposure to Noise

As part of a medical surveillance program, a hearing conservation program shall be developed and followed (Section 2.12.4(2) of the Health, Safety and Reclamation Code for Mines in British Columbia).

Persons who work in an excessive noise occupation shall be advised of the health risks. The maximum permissible noise exposure for unprotected ears on a daily basis is 85 dBa average for eight hours or equivalent, including impact noise.

Work Areas With High Noise

High noise areas may include concentrator crusher houses, breakers and many processing plants, and certain maintenance areas and work systems (e.g. riveting, grinding, power tools).

In order to identify areas or systems where noise levels may be a concern, the preferred method of determining the risk of hearing loss to persons working there is by measuring the exposure over the working shift. The persons affected wear a noise dosimeter for the shift and the noise level to which they are exposed is calculated from the result. If there are concerns that noise levels in an area may be a hazard the advice of the Resource Management Branch Industrial Hygienist should be sought as to the best procedure for measuring the level of noise.

The Prevention and Mitigation of High Noise Levels

Noise levels may be reduced by engineering design of the noise source or by the use of suitable acoustical shielding. If these measures are not possible, then administrative arrangements to limit the time of exposure should be considered. Only as a last resort should personal protective equipment such as ear muffs and/or ear plugs be used.

Appendix 4 (Cont'd.)

The use of personal protective equipment is the principal method currently employed to reduce the exposure of individuals to noise. This method has many deficiencies such as incorrect assessment of the noise level, inappropriate hearing protection, inadequate training in the use of hearing protection equipment and incorrect fitting of hearing protection. Finally, some persons are more susceptible to noise-induced hearing loss than others, so standard personal protective measures may not provide adequate protection.

When considering the value of introducing engineering and/or administrative controls, the effect of activities outside the working environment may have to be taken into account in the audiometric assessment.

Audiometric Monitoring

The program for medical surveillance with respect to noise-induced hearing loss should comply with the conditions prescribed in the Audiometric Training Manual issued by the Ministry of Energy, Mines and Petroleum Resources.